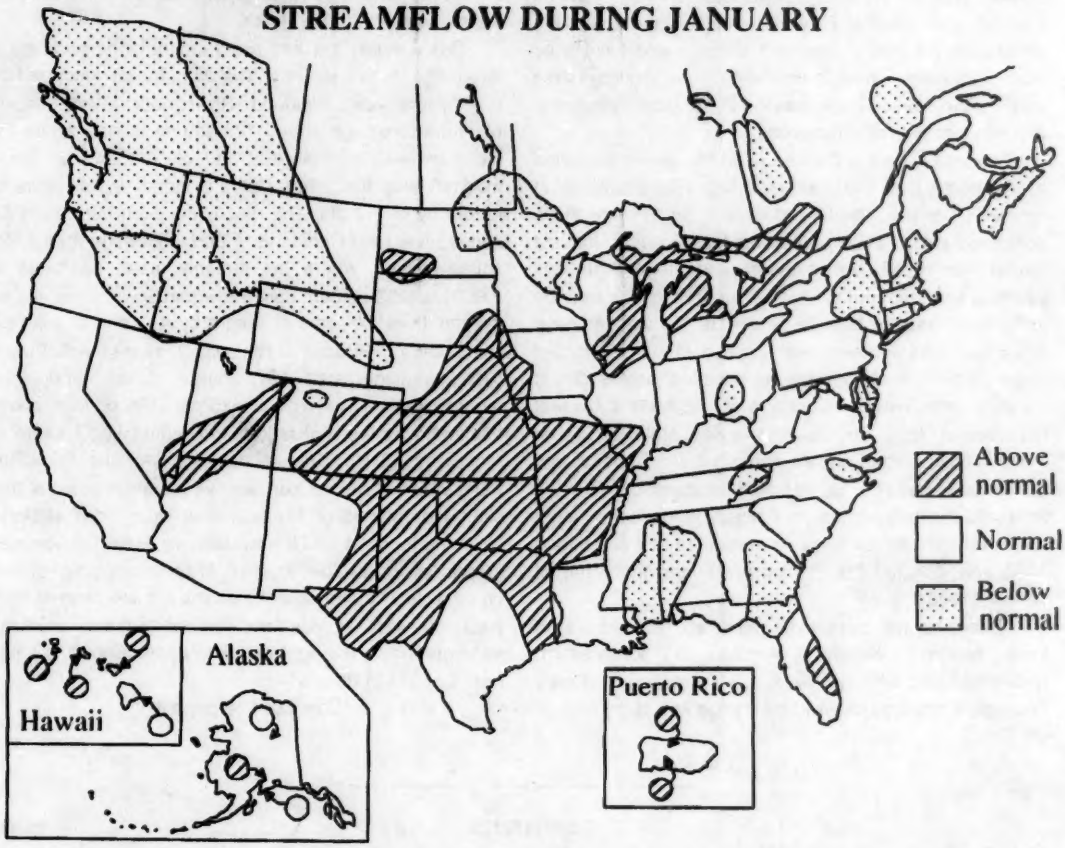
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

JANUARY 1988

STREAMFLOW DURING JANUARY



Streamflow was in the normal to above-normal range at 72 percent of the 191 reporting index stations in southern Canada, the United States, and Puerto Rico, compared with the 75 percent in those ranges for last month. Total January flow of 1,558,950 cubic feet per second (cfs) for the 181 index stations in the conterminous United States and southern Canada was 8.2 percent above median, and 21 percent above last month's total.

Below-normal streamflow persisted in a large area from southern British Columbia to northwestern Nebraska, and also in several smaller areas. Flows decreased into the below-normal range in a large area of southwestern Canada and Montana, several other small areas adjacent to those of persistently below-normal flows, and also in some larger areas centered on northeastern Minnesota and Massachusetts. Above-normal streamflow persisted in a large area centered on Kansas and Oklahoma, and also in several smaller areas, the largest centered on Lake Michigan. Flows increased into the above-normal range in several small areas, the largest of which was in Ontario and Quebec, north and east of Lake Huron.

Mean January elevations at the four master gages on the Great Lakes (provisional National Ocean Service data) were in the normal range at all four gages for the first time since October 1982. Levels declined from those for last month at all four gages and were also lower than those for January 1987 at all four gages.

The level of Utah's Great Salt Lake rose 0.05 foot during the month and was at 4,209.50 feet above National Geodetic Vertical Datum (NGVD) of 1929 on January 31, 1.90 feet lower than on January 31, 1987.

The combined flow of the 3 largest rivers in the lower 48 States--Mississippi, St. Lawrence, and Columbia--averaged an above-normal 1,214,800 cfs (about 22 percent above median) during January, an increase of about 51 percent from December to January. Mean flow of the Columbia River at The Dalles, Oregon, was in the below-normal range for the eighth consecutive month after decreasing by about 2 percent from December to January.

Contents of 74 percent of reporting reservoirs were near or above average for the end of January, compared with 75 percent for the end of December.

SURFACE-WATER CONDITIONS DURING JANUARY 1988

Flows generally increased from December to January in about a third of the Provinces and States: seasonally in California, Nevada, Arizona, Kansas, Louisiana, Mississippi, Alabama, Georgia, the Carolinas, Tennessee, Kentucky, Ohio, West Virginia, Virginia, Maryland, and Rhode Island; and contraseasonally in Saskatchewan and South Dakota. Flows changed seasonally in Oregon and Arkansas, and variably in Hawaii, Idaho, Wyoming, Colorado, Texas, Indiana, Florida, and Puerto Rico. Streamflow generally decreased in the rest of southern Canada and the United States: variably in Washington, Utah, New Mexico, Texas and Pennsylvania; contraseasonally in Massachusetts; and seasonally in all other areas.

Streamflow was in the normal to above-normal range at 74 percent of the 191 reporting index stations in southern Canada, the United States, and Puerto Rico, compared with the 76 percent in those ranges for last month. This is the second lowest percentage of stations with flow in the normal to above-normal range for January in the last 6 years. About 65 percent of 191 stations were in the normal to above-normal range in January 1985 and about 75 percent of 191 stations were in those ranges in January 1986. Total January flow of 1,558,950 cubic feet per second (cfs) for the 181 index stations in the conterminous United States and southern Canada was 8.2 percent above median, 21 percent above last month's total, and the third highest for January in the last 6 years: about 418,700 cfs (26 percent) more than that of January 1986 and 484,300 cfs (19 percent) less than that of January 1983.

Below-normal streamflow persisted in a large area from southern British Columbia to northwestern Nebraska, and also in several smaller areas. Flows decreased into the below-normal range in a large area of southwestern Canada and Montana, several other small areas adjacent to those of persistently below-normal flows, and also in some larger areas centered on northeastern Minnesota and Massachusetts. Above-normal streamflow persisted in a large area centered on Kansas and Oklahoma, and also in several smaller areas, the largest centered on Lake Michigan. Flows increased into the above-normal range in several small areas, the largest of which was in Ontario and Quebec, north and east of Lake Huron.

One January low and two January highs occurred at streamflow index stations. The January low occurred on the Middle Fork Flathead River near West Glacier, Montana (drainage area 1,128 square miles), where the monthly mean discharge of 317 cfs (51 percent below median) was the lowest for the month in 48 years of record by only 2 cfs. The new highs occurred on the St. Johns River near Christmas, Florida (drainage area 1,539 square miles), where the monthly mean discharge of 2,650 cfs (235 percent above median) was the highest for the month in 54 years of record by 119 cfs, and on the Rio Grande De Manati at Highway 2, near Manati, Puerto Rico (drainage area 197 square miles), where the monthly mean discharge of 585 cfs (156 percent above median) was the highest for the month in 17 years of record by 52 cfs. The January high for the St. Johns River was the second consecutive monthly record at that site. Hydrographs of streamflow at eight index stations, including those at which new January extremes occurred (upper left for the low, lower right for the two highs), are on page 5. The hydrographs on the left are arrayed from west to east across the United States and the hydrographs on the right are arrayed from north to south from Canada to Puerto Rico.

(Continued on page 4.)

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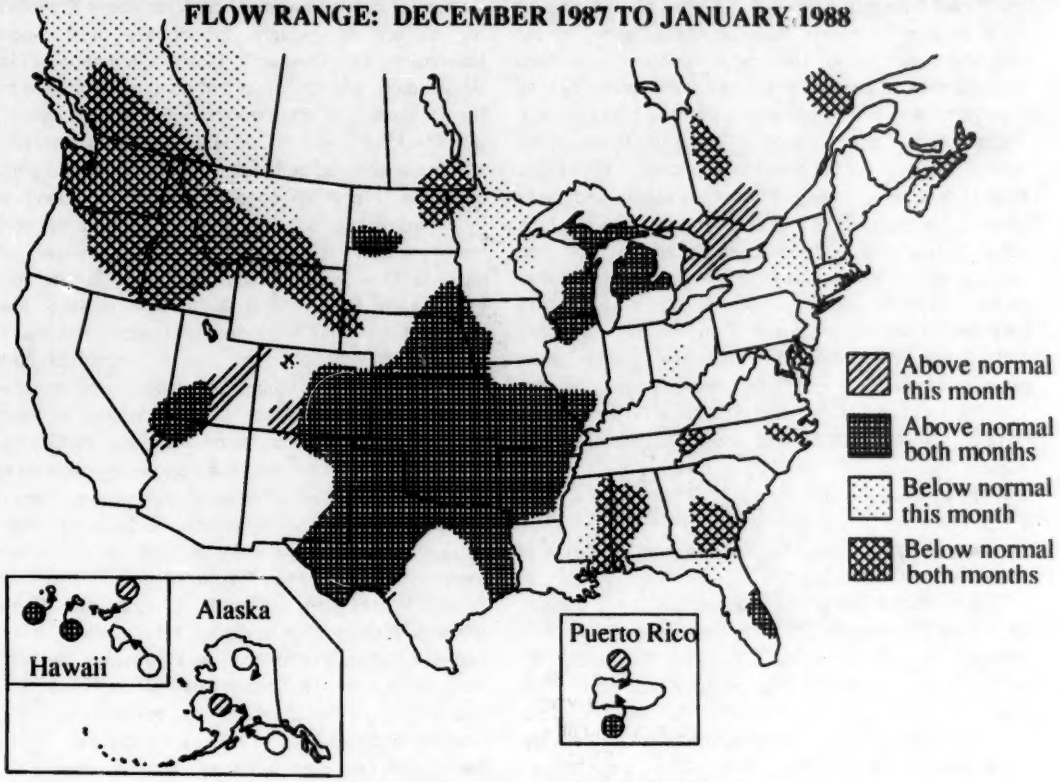
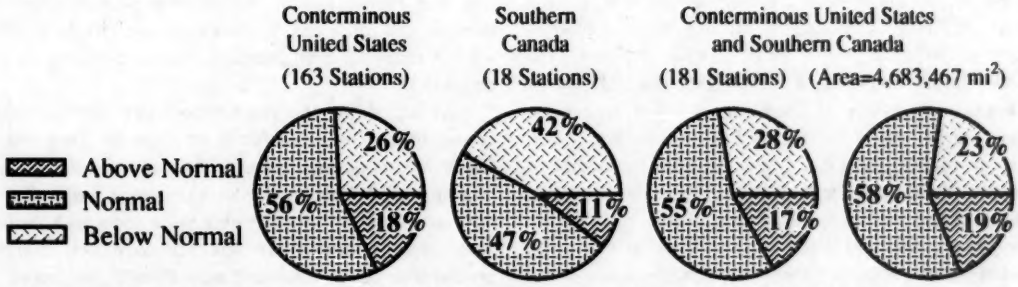
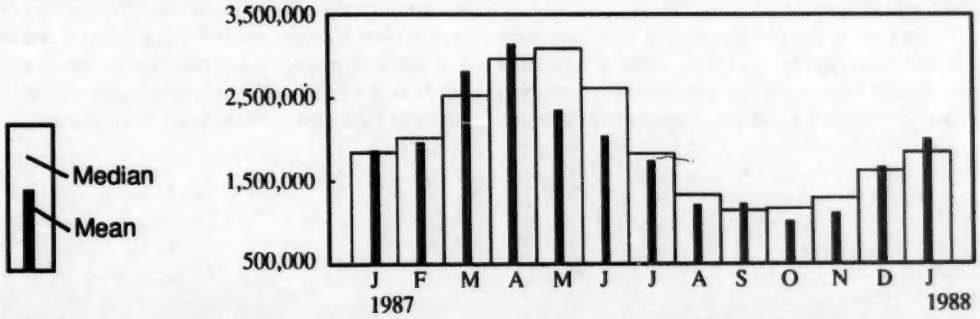
PERSISTENCE IN, OR MOVEMENT INTO, THE BELOW-NORMAL OR ABOVE-NORMAL FLOW RANGE: DECEMBER 1987 TO JANUARY 1988



SUMMARY OF JANUARY 1988 STREAMFLOW
FLOW RANGES



COMPARISON OF TOTAL MONTHLY MEANS WITH TOTAL MONTHLY MEDIANS (Cubic Feet per Second)



Mean January elevations at the four master gages on the Great Lakes (provisional National Ocean Service data) were in the normal range at all four gages for the first time since October 1982. Levels declined from those for last month at all four gages: on Lake Superior by 0.26 foot, which was in the normal range for the 10th consecutive month; on Lake Huron by 0.19 foot, which was in the normal range for the 6th consecutive month; on Lake Erie by 0.16 foot, which was in the normal range, ending 43 consecutive months in the above-normal range (June 1984 - December 1987); on Lake Ontario by 0.04 foot, which was in the normal range for the 3rd consecutive month. Levels ranged from 0.95 foot (Lake Superior) to 1.88 feet (Lake Huron) lower than those for January 1987. Stage hydrographs at the master gages for Lakes Superior, Huron, Erie, and Ontario are on page 6.

The level of Utah's Great Salt Lake (see graph on page 6) rose to 4,209.50 feet above National Geodetic Vertical Datum (NGVD) of 1929 on January 15, and was also at that elevation on January 31. The monthend level is 1.90 feet lower than that of January 31, 1987, but is still the second highest recorded for the end of January, below only that of January 1987.

The combined flow of the 3 largest rivers in the lower 48 States--Mississippi, St. Lawrence, and Columbia--averaged an above-normal 1,214,800 cfs (about 22 percent above median) during January, an increase of about 51 percent from December to January. This month's combined flow was the third highest for January in the last 6 years and 256,800 cfs (28 percent) higher than that for January 1987. Mean flow of the St. Lawrence River at Cornwall, Ontario, decreased by about 11 percent from that for December and was in the normal range after an above-normal December. Mean flow of the Mississippi River at Vicksburg, Mississippi, increased by about 92 percent from that for December, and was in the above-normal range after a normal December. Mean flow of the Columbia River at The Dalles, Oregon, was in the below-normal range for the eighth consecutive month after decreasing by about 2 percent from December to January. Flow hydrographs for both the combined and individual flows of the "Big 3" are shown on page 8. Dissolved solids and water temperatures at five large river stations are given on page 8. January flows of the "Big 3" and other large rivers are given in the Flow of Large Rivers table on page 9.

Contents of 74 percent of reporting reservoirs were near or above average for the end of January, compared with 75 percent for the end of December. Most reporting reservoirs in Oklahoma, Texas, New Mexico, Arizona, and Colorado had contents that were more than 5 percent of normal maximum contents above the average for the end of January. In contrast, most reporting reservoirs in Quebec, Maine, Montana, Idaho, Washington, and California had contents that were more than 5 percent of normal maximum contents below the average for the end of January. Reservoirs or reservoir systems which had both a decline of more than 5 percent of normal maximum contents during the month and monthend contents more than 5 percent of normal maximum contents below monthend averages were: all of those for Quebec and Maine, all of those in Washington except Lake Merwin, and Coeur d'Alene Lake, Idaho. Lake Murray, South Carolina, was the only site that had both an increase of more than 5 percent of normal maximum contents during the month and monthend contents that were more than 5 percent of normal maximum contents above monthend averages. Graphs of contents for seven reservoirs are shown on page 10 with contents for the 99 reporting reservoirs given on page 11.

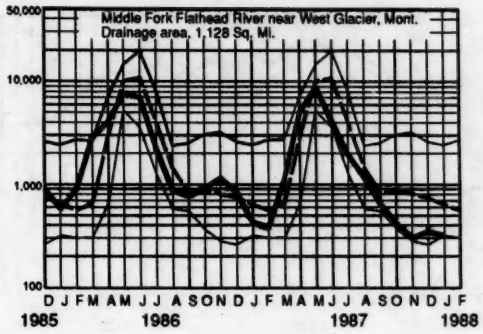
January precipitation (provisional National Weather Service data) was generally an inch or more below normal only at one site in Alaska, several sites scatterred through Washington, California, Oregon, and Arizona, and also at many sites in the arc from eastern Texas to southern Maine. Precipitation was generally an inch or more above normal at sites in Puerto Rico, Florida, a few sites in Georgia and the Carolinas, scattered sites in the Midwest, and two sites in Hawaii. Record-high January precipitation (amounts in inches) occurred at only three cities: Marquette, Michigan (4.02); Fargo, North Dakota (1.62); and Goodland, Kansas (1.59). The only record low occurred at Rochester, New York (0.67). Total Precipitation and Percentage of Normal Precipitation maps for January are on page 7. February through April 1988 outlook maps for both temperature and precipitation are on page 15.

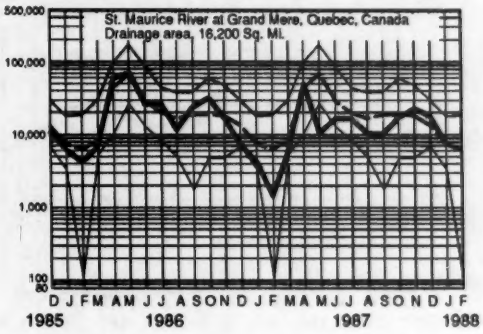
A list of the 163 streamflow index stations in the conterminous United States is on page 14. Two sets of identification numbers precede the station name: the first is a four-digit National Water Conditions index station number composed of a two-digit State code, with leading zero dropped, and a two-digit site code (any number greater than 05 indicates a "Large River"); the second is the standard U.S. Geological Survey station identification number with the first two digits indicating the ***part*** *number and the last six digits indicating downstream order within the* ***part*** *(increasing in the downstream direction). [The list is confined to those in the conterminous United States because there was no more room on the page.]*

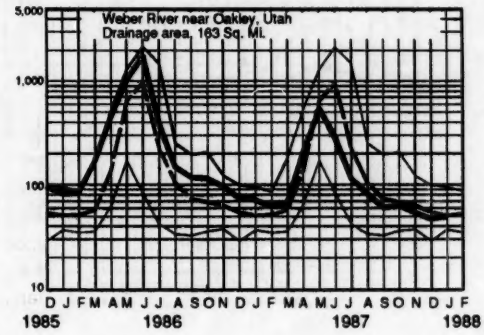
MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

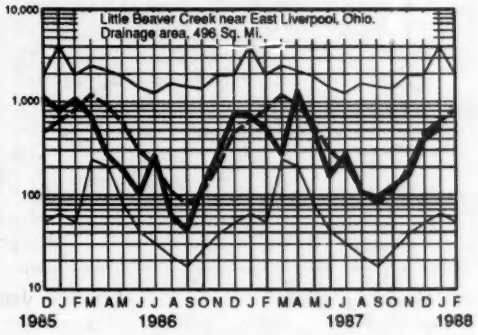
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.

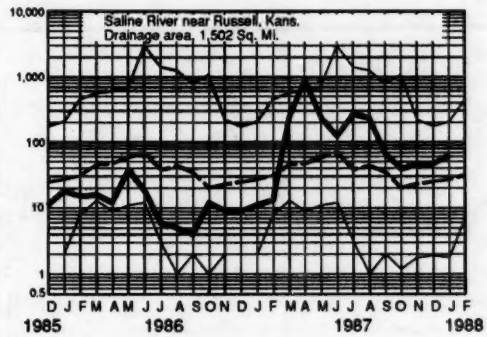
DISCHARGE, IN CUBIC FEET PER SECOND

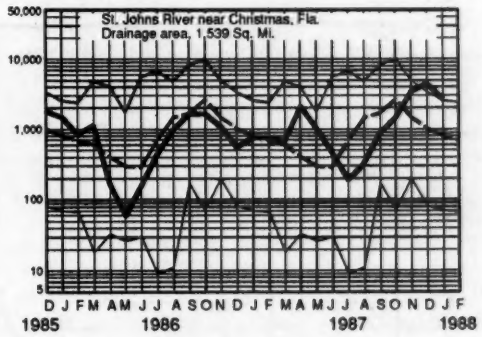

Middle Fork Flathead River near West Glacier, Mont.
Drainage area, 1,128 Sq. Mi.
50,000
10,000
1,000
100
D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988

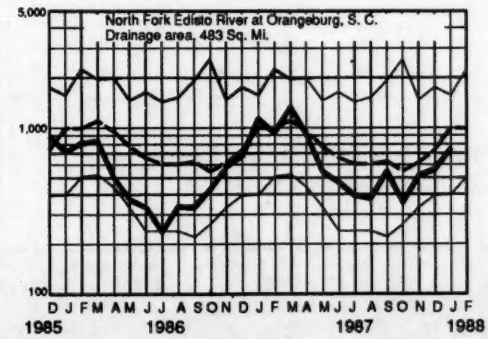


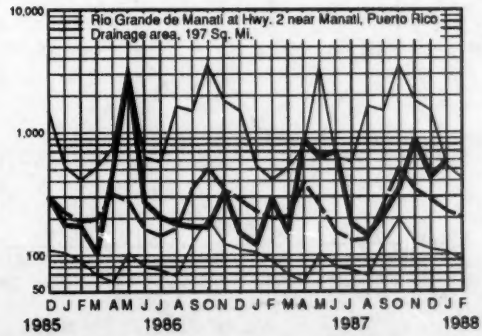



Little Beaver Creek near East Liverpool, Ohio.
Drainage area, 496 Sq. Mi.
10,000
1,000
100
10
D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988



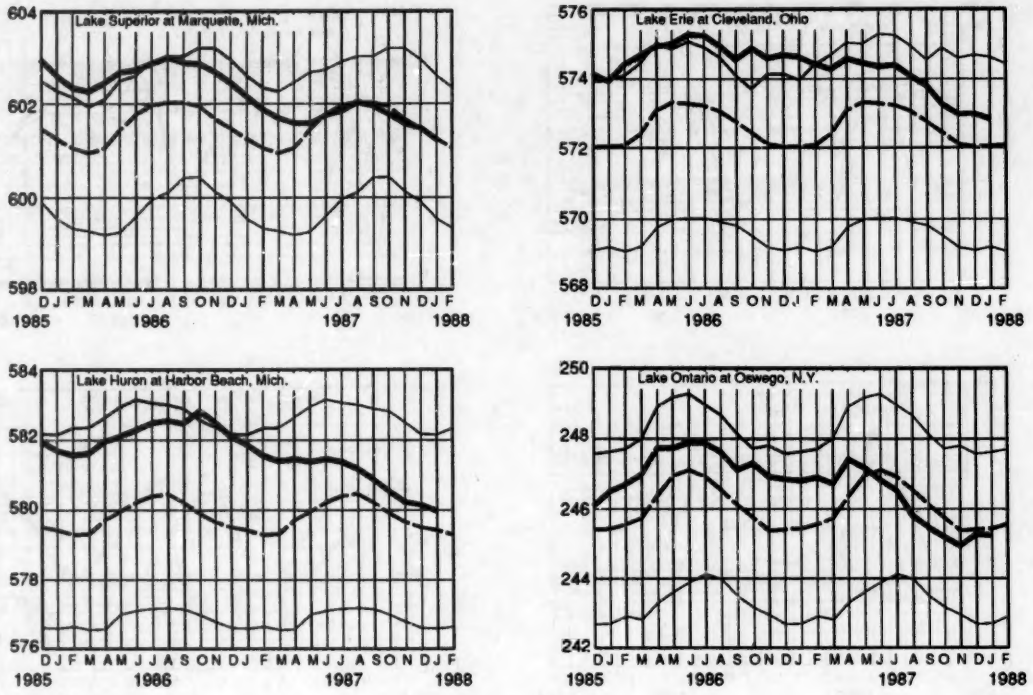



North Fork Edisto River at Orangeburg, S. C.
Drainage area, 483 Sq. Mi.
5,000
1,000
100
D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988


Rio Grande de Manati at Hwy. 2 near Manati, Puerto Rico
Drainage area, 197 Sq. Mi.
10,000
1,000
100
50
D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988

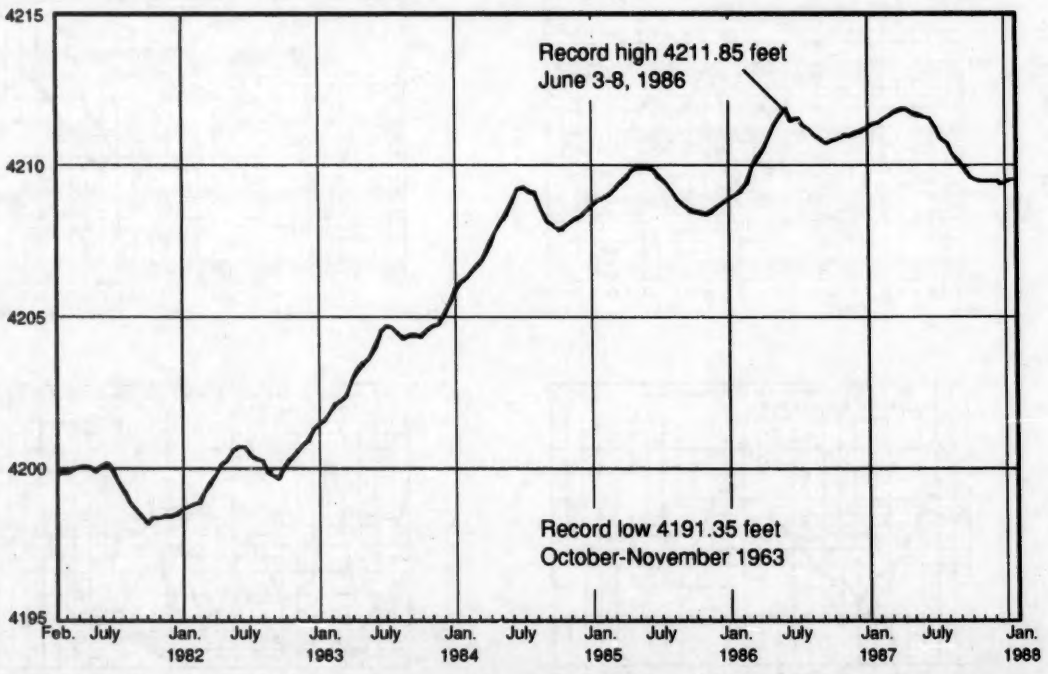
GREAT LAKES ELEVATIONS

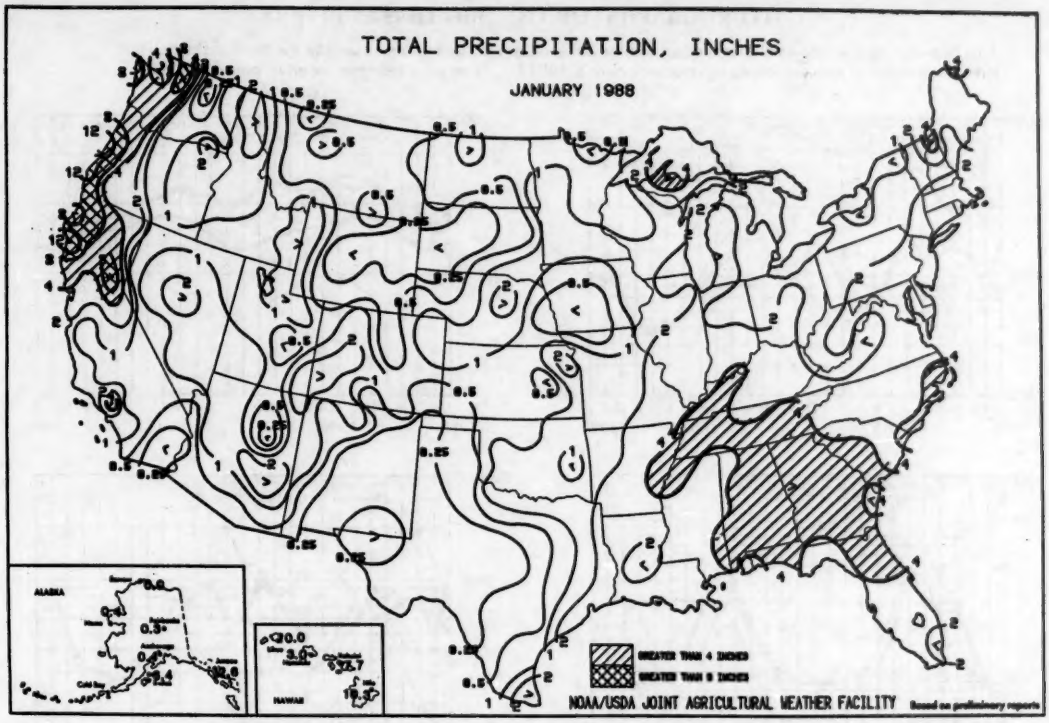
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period. Data from National Ocean Service.

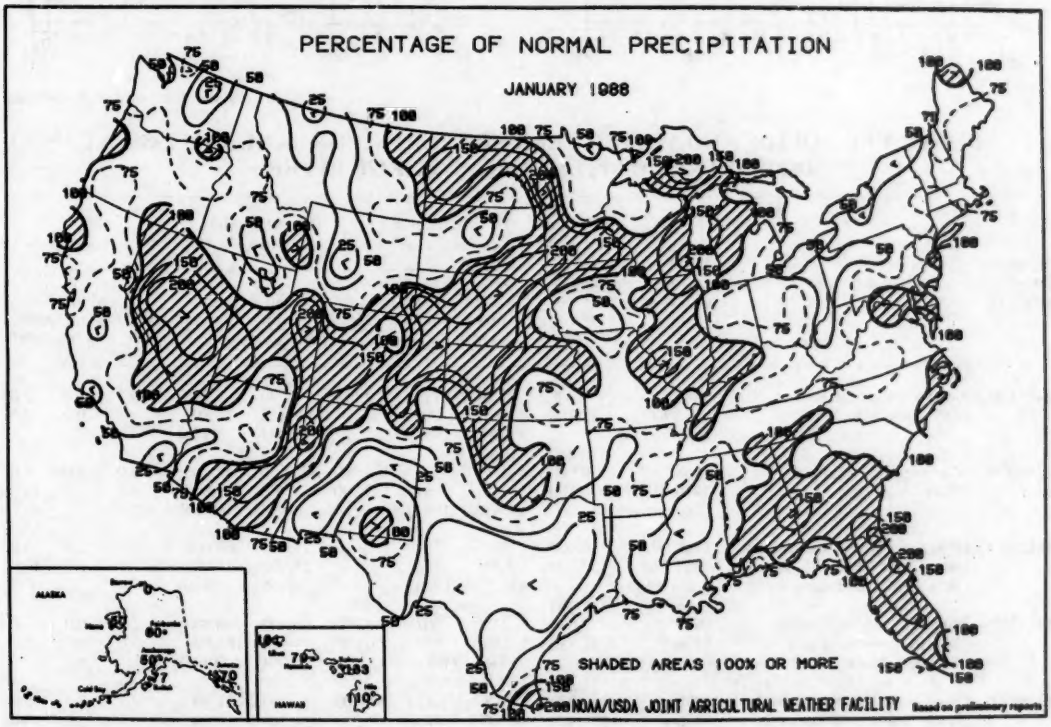


ELEVATION, IN FEET ABOVE NATIONAL GEODETIC VERTICAL DATUM OF 1929

Fluctuations of Great Salt Lake, February 1981 through January 1988



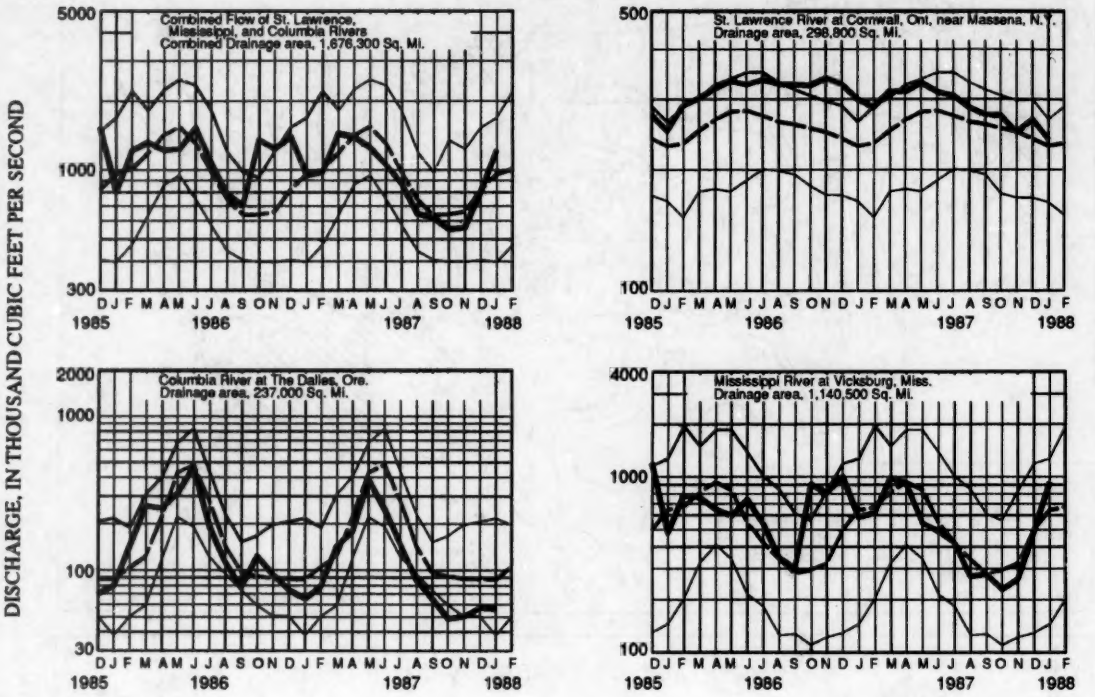



PERCENTAGE OF NORMAL PRECIPITATION
JANUARY 1988
75 SHADED AREAS 100% OR MORE
NOAA/USDA JOINT AGRICULTURAL WEATHER FACILITY
Based on preliminary reports

(From *Weekly Weather and Crop Bulletin* prepared and published by the NOAA/USDA Joint Agricultural Weather Facility)

HYDROGRAPHS FOR THE "BIG THREE" RIVERS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.


DISCHARGE, IN THOUSAND CUBIC FEET PER SECOND
Combined Flow of St. Lawrence, Mississippi, and Columbia Rivers
Combined Drainage area, 1,676,300 Sq. Mi.
5000
1000
300
St. Lawrence River at Cornwall, Ont, near Massena, N.Y.
Drainage area, 298,800 Sq. Mi.
500
100
Columbia River at The Dalles, Ore.
Drainage area, 237,000 Sq. Mi.
2000
1000
100
30
Mississippi River at Vicksburg, Miss.
Drainage area, 1,140,500 Sq. Mi.
4000
1000
100
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988

Provisional data; subject to revision

DISSOLVED SOLIDS AND WATER TEMPERATURES, FOR JANUARY 1988, AT DOWNSTREAM SITES ON FIVE LARGE RIVERS

Station number	Station name	January data of following calendar years	Stream discharge during month	Dissolved-solids concentration[a]		Dissolved-solids discharge[a]			Water temperature[b]		
			Mean (cfs)	Minimum (mg/L)	Minimum (mg/L)	Mean	Minimum (tons per day)	Minimum	Mean in °C	Minimum, in °C	Minimum, in °C
01463500	Delaware River at Trenton, N.J. (Morrisville, Pa.)	1988	6,900	103	117	2,060	1,500	4,220	0.5	0.0	2.0
		1945-87	12,700	62	201	---	758	20,800	---	0.0	7.5
		(Extreme yr)	[c]10,440	(1951, 1960)	(1959)		(1981)	(1976)			
07289000	Mississippi River at Vicksburg, Miss.	1988	920,600	180	215	484,500	342,600	655,100	4.0	2.0	6.0
		1976-87	630,800	157	299	332,200	128,000	619,000	4.0	0.0	10.0
		(Extreme yr)	[c]645,700	(1979)	(1981)		(1981)	(1985)			
03612500	Ohio River at lock and dam 53, near Grand Chain, Ill. (streamflow station at Metropolis, Ill.)	1988	316,000	204	251	---	71,000	366,000	---	2.5	5.0
		1955-87	352,800	98	382	---	28,500	448,000	---	0.0	10.0
		(Extreme yr)	[c]362,300	(1973)	(1964)		(1956)	(1970)			
06934500	Missouri River at Hermann, Mo. (60 miles west of St. Louis, Mo.)	1988	70,500	345	502	78,600	66,400	106,000	2.0	0.0	5.0
		1976-87	48,930	159	553	56,090	18,100	160,000	2.0	0.0	5.5
		(Extreme yr)	[c]33,290	(1976)	(1977)		(1981)	(1985)			
14128910	Columbia River at Warrendale, Oreg. (streamflow station at The Dalles, Oreg.)	1988	156,000	98	115	44,700	32,700	61,500	4.5	3.5	5.0
		1976-87	172,800	76	125	49,200	24,300	79,800	3.5	0.0	9.0
		(Extreme yr)	[c]86,480	(1978)	(1983)		(1979)	(1984)			

[a]Dissolved-solids concentrations, when not analyzed directly, are calculated on basis of measurements of specific conductance.
[b]To convert °C to °F: [(1.8 X °C) + 32] = °F.
[c]Median of monthly values for 30-year reference period, water years 1951-80, for comparison with data for current month.

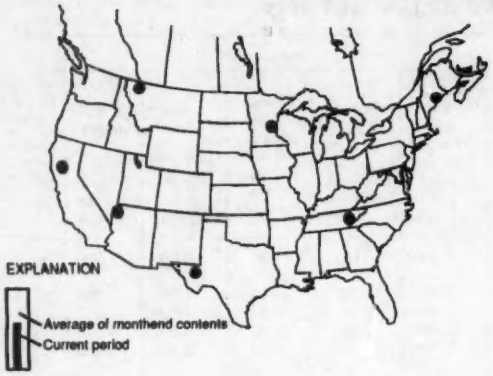
Provisional data; subject to revision

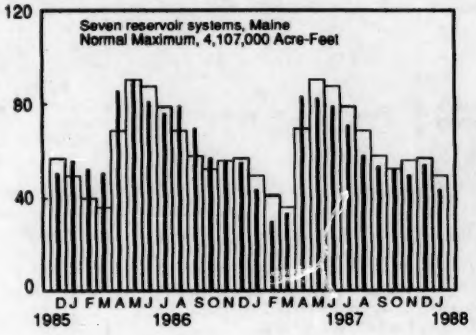
FLOW OF LARGE RIVERS DURING JANUARY 1988

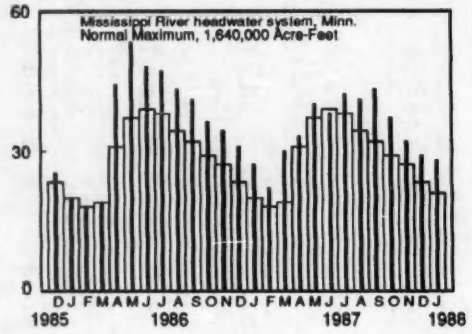
Station number	Stream and place of determination	Drainage area (square miles)	Average discharge through September 1980 (cubic feet per second)	January 1988					
				Monthly mean discharge (cubic feet per second)	Percent of median monthly discharge, 1951—80	Change in discharge from previous month (percent)	Discharge near end of month		
							Cubic feet per second	Million gallons per day	Date
01014000	St. John River below Fish River at Fort Kent, Maine	5,690	9,647	3,260	116	−53	3,000	1,900	31
01318500	Hudson River at Hadley, N.Y.	1,664	2,909	1,320	75	−54	1,090	704	31
01357500	Mohawk River at Cohoes, N.Y.	3,456	5,734	2,580	57	−54	1,500	970	31
01463500	Delaware River at Trenton, N.J.	6,780	11,750	6,900	66	−45	6,050	3,910	31
01570500	Susquehanna River at Harrisburg, Pa.	24,100	34,530	[1]31,190	91	−16	55,600	35,940	25
01646500	Potomac River near Washington, D.C.	11,560	[1]11,490	[1]14,050	107	+16	11,800	7,630	31
02105500	Cape Fear River at William O. Huske Lock near Tarheel, N.C.	4,810	5,005	5,870	80	+272	.....	....	..
02131000	Pee Dee River at Peedee, S.C.	8,830	9,851	14,600	104	+55	12,300	7,950	31
02226000	Altamaha River at Doctortown, Ga.	13,600	13,880	7,535	46	+175	11,400	7,370	25
02320500	Suwannee River at Branford, Fl.	7,880	6,987	2,910	58	+8	3,720	2,404	27
02358000	Apalachicola River at Chattahoochee, Fl.	17,200	22,570	19,800	68	+128	21,100	13,640	31
02467000	Tombigbee River at Demopolis lock and dam near Coatopa, Ala.	15,400	23,300	20,230	54	+209	14,500	9,370	29
02489500	Pearl River near Bogalusa, La.	6,630	9,768	5,082	52	+63	4,000	2,600	31
03049500	Allegheny River at Natrona, Pa.	11,410	[1]19,480	[1]18,500	83	+44	33,400	21,590	24
03085000	Monongahela River at Braddock, Pa.	7,337	[1]12,510	[1]17,200	91	+3	83,300	53,840	21
03193000	Kanawha River at Kanawha Falls, W.Va.	8,367	12,590	13,000	81	+4	11,000	7,100	27
03234500	Scioto River at Higby, Ohio.	5,131	4,547	1,329	24	+29	1,210	782	29
03294500	Ohio River at Louisville, Ky.[2]	91,170	11,600	116,900	77	−4	74,460	48,120	31
03377500	Wabash River at Mount Carmel, Ill.	28,635	27,220	28,728	112	+19	23,200	14,990	28
03469000	French Broad River below Douglas Dam, Tenn.	4,543	6,798	4,865	57	+53	.....	....	..
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wis.[2]	6,150	4,163	4,529	124	−15	6,895	4,456	31
04264331	St. Lawrence River at Cornwall, Ontario–near Massena, N.Y.[3]	298,800	242,700	238,000	104	−11	240,000	155,000	31
02NG001	St. Maurice River at Grand Mere, Quebec	16,300	25,150	7,580	102	−58	24,400	15,770	30
05082500	Red River of the North at Grand Forks, N.Dak.	30,100	2,551	450	40	−25	420	271	31
05133500	Rainy River at Manitou Rapids, Minn.	19,400	11,830	7,100	74	−1	6,700	4,330	28
05330000	Minnesota River near Jordan, Minn.	16,200	3,402	527	108	−36	400	260	31
05331000	Mississippi River at St. Paul, Minn.	36,800	[1]10,610	3,388	70	−27	2,480	1,602	31
05365500	Chippewa River at Chippewa Falls, Wis.	5,600	5,100	1,991	67	−47	1,580	1,021	31
05407000	Wisconsin River at Muscoda, Wis.	10,300	8,617	6,645	110	−15	7,500	4,850	31
05446500	Rock River near Joslin, Ill.	9,551	5,873	8,610	235	−8	8,000	5,200	31
05474500	Mississippi River at Keokuk, Iowa.	119,000	62,620	46,940	136	−23	63,500	41,040	31
06214500	Yellowstone River at Billings, Mont.	11,796	7,038	2,080	83	−9	2,390	1,544	29
06934500	Missouri River at Hermann, Mo.	524,200	79,490	68,260	205	−28	59,000	38,100	27
07289000	Mississippi River at Vicksburg, Miss.[4]	1,140,500	576,600	920,600	143	+92	758,000	489,900	25
07331000	Washita River near Dickson, Okla.	7,202	1,368	3,230	912	−34	2,200	1,420	31
08276500	Rio Grande below Taos Junction Bridge, near Taos, N.Mex.	9,730	725	556	133	−6	640	413	31
09315000	Green River at Green River, Utah.	44,850	6,298	3,911	156	+18	....	....	..
11425500	Sacramento River at Verona, Calif.	21,257	18,820	23,960	85	+62	....	....	..
13269000	Snake River at Weiser, Idaho.	69,200	18,050	10,700	65	−4	11,400	7,370	31
13317000	Salmon River at White Bird, Idaho.	13,550	11,250	3,060	72	−1	3,370	2,178	31
13342500	Clearwater River at Spalding, Idaho.	9,570	15,480	3,290	46	+26	3,380	2,184	31
14105700	Columbia River at The Dalles, Oreg.[5]	237,000	[1]193,100	[1]56,200	65	−2	147,000	95,000	26
14191000	Willamette River at Salem, Oreg.	7,280	[1]23,510	[1]49,400	86	+44	25,600	16,550	26
15515500	Tanana River at Nenana, Alaska.	25,600	23,460	6,903	106	−12	6,600	4,270	31
08MF005	Fraser River at Hope, British Columbia.	83,800	96,290	22,000	62	−24	23,940	15,470	29

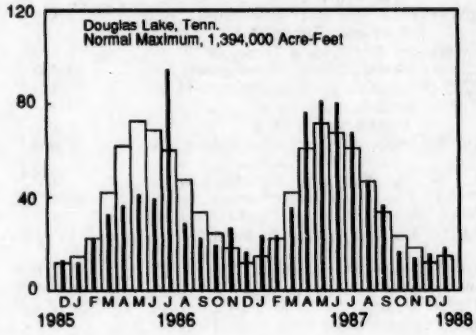
[1]Adjusted.
[2]Records furnished by Corps of Engineers.
[3]Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[4]Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[5]Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS

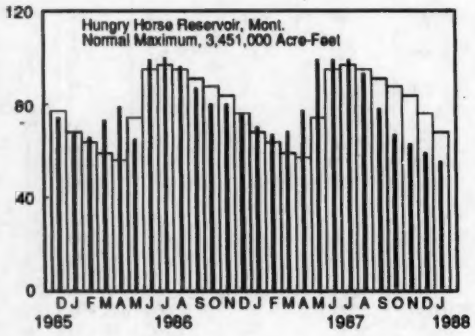


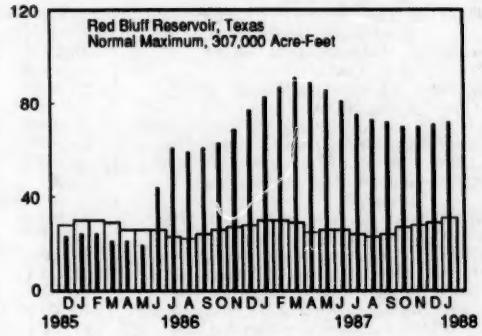


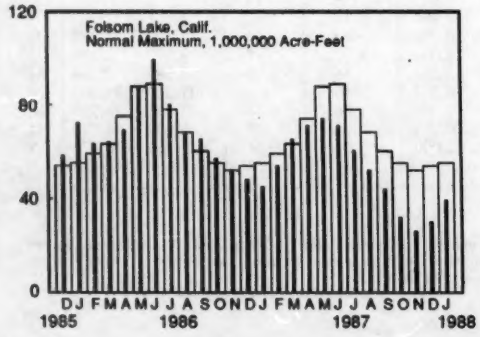


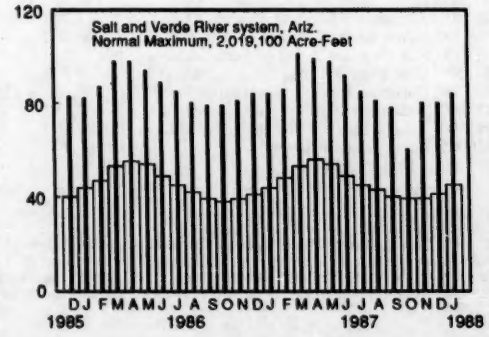


PERCENT OF NORMAL MAXIMUM









USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF JANUARY 1988

[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	Percent of normal maximum				Normal maximum[a] (acre-feet)
	End of Jan. 1988	End of Jan. 1987	Average for end of Jan.	End of Dec. 1987	
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs(P)	. .	40	57	53	[b]226,300
QUEBEC					
Allard (P)	16	60	46	22	280,600
Gouin (P)	40	78	59	48	6,954,000
MAINE					
Seven reservoir systems (MP)	43	43	49	54	4,107,000
NEW HAMPSHIRE					
First Connecticut Lake (P)	41	41	36	66	76,450
Lake Francis (FPR)	50	45	51	75	99,310
Lake Winnipesaukee (PR)	50	62	58	59	165,700
VERMONT					
Harriman (P)	53	45	47	67	116,200
Somerset (P)	61	64	59	80	57,390
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	75	76	71	79	77,920
NEW YORK					
Great Sacandaga Lake (FPR)	45	42	45	69	786,700
Indian Lake (FMP)	53	71	54	59	103,300
New York City reservoir system (MW)	85	87	84	87	1,680,000
NEW JERSEY					
Wanaque (M)	78	94	76	83	85,100
PENNSYLVANIA					
Allegheny (FPR)	26	31	30	31	1,180,000
Pymatuning (FMR)	82	72	83	88	188,000
Raystown Lake (FR)	67	67	56	67	761,900
Lake Wallenpaupack (PR)	53	58	53	57	157,800
MARYLAND					
Baltimore municipal system (M)	87	71	85	86	261,900
NORTH CAROLINA					
Bridgewater (Lake James) (P)	87	91	79	92	288,800
Narrows (Badin Lake) (P)	90	91	95	87	128,900
High Rock Lake (P)	54	61	66	54	234,800
SOUTH CAROLINA					
Lake Murray (P)	84	89	66	75	1,614,000
Lakes Marion and Moultrie (P)	65	76	69	64	1,862,000
SOUTH CAROLINA—GEORGIA					
Clark Hill (FP)	38	82	61	35	1,730,000
GEORGIA					
Burton (PR)	66	80	58	81	104,000
Sinclair (MPR)	89	96	83	88	214,000
Lake Sidney Lanier (FMPR)	44	48	53	38	1,686,000
ALABAMA					
Lake Martin (P)	74	86	68	73	1,375,000
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	32	41	34	28	2,293,000
Douglas Lake (FPR)	18	23	14	15	1,394,000
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	55	52	42	67	1,012,000
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	38	46	34	36	2,880,000
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	45	47	40	40	1,478,000
WISCONSIN					
Chippewa and Flambeau (PR)	84	60	44	91	365,000
Wisconsin River (21 reservoirs) (PR)	55	40	35	67	399,000
MINNESOTA					
Mississippi River headwater system (FMR)	28	27	21	29	1,640,000
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	78	86	82	80	22,700,000
SOUTH DAKOTA					
Angostura (I)	69	90	72	68	130,768
Belle Fourche (I)	68	68	49	64	185,200
Lake Francis Case (FIP)	67	66	68	57	4,589,000
Lake Oahe (FIP)	81	80	. . .	82	22,240,000
Lake Sharpe (FIP)	104	100	99	105	1,697,000
Lewis and Clark Lake (FIP)	98	91	103	98	432,000
NEBRASKA					
Lake McConaughy (IP)	77	81	73	76	1,948,000
OKLAHOMA					
Eufaula (FRP)	106	107	85	136	2,378,000
Keystone (FPR)	105	86	86	117	661,000
Tenkiller Ferry (FPR)	110	106	91	154	628,200
Lake Altus (FIMR)	100	100	48	90	133,000
Lake O'The Cherokees (FPR)	95	88	79	118	1,492,000
OKLAHOMA—TEXAS					
Lake Texoma (FMPRW)	100	100	88	105	2,722,000
TEXAS					
Bridgeport (IMW)	82	94	47	81	386,400
Canyon (FMR)	92	100	80	89	385,600
International Amistad (FIMPW)	101	84	84	100	3,497,000
International Falcon (FIMPW)	104	72	73	104	2,668,000
Livingston (IMW)	100	103	89	102	1,788,000
Possum Kingdom (IMPRW)	66	94	95	66	570,200
Red Bluff (PI)	72	83	31	71	307,000
Toledo Bend (P)	93	91	85	85	4,472,000
Twin Buttes (FIM)	82	50	31	80	177,800
Lake Kemp (IMW)	87	101	85	86	268,000
Lake Meredith (FWM)	36	29	37	36	796,900
Lake Travis (FIMPRW)	95	103	81	134	1,144,000
MONTANA					
Canyon Ferry (FIMPR)	71	76	81	75	2,043,000
Fort Peck (FPR)	79	85	82	81	18,910,000
Hungry Horse (FIPR)	55	70	68	59	3,451,000
WASHINGTON					
Ross (PR)	38	57	55	52	1,052,000
Franklin D. Roosevelt Lake (IP)	71	94	83	77	5,022,000
Lake Chelan (PR)	29	38	45	46	676,100
Lake Cushman (PR)	50	42	80	62	359,500
Lake Merwin (P)	101	101	97	101	245,600
IDAHO					
Boise River (4 reservoirs) (FIP)	25	6	60	30	1,235,000
Coeur d'Alene Lake (P)	12	16	49	24	238,500
Pend Oreille Lake (FP)	33	39	53	33	1,561,000
IDAHO—WYOMING					
Upper Snake River (8 reservoirs) (MP)	51	57	66	43	4,401,000
WYOMING					
Boysen (FIP)	74	78	71	79	802,000
Buffalo Bill (IP)	46	64	65	45	421,300
Keyhole (F)	40	34	42	40	193,800
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	59	69	50	58	3,056,000
COLORADO					
John Martin (FIR)	78	87	20	74	364,400
Taylor Park (IR)	71	72	55	71	106,200
Colorado–Big Thompson project (I)	69	82	58	69	730,300
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	86	84	. . .	85	31,620,000
UTAH—IDAHO					
Bear Lake (IPR)	71	74	58	70	1,421,000
CALIFORNIA					
Folsom (FIP)	39	45	55	30	1,000,000
Hetch Hetchy (MP)	43	36	33	46	360,400
Isabella (FIR)	26	43	28	25	568,100
Pine Flat (FI)	25	61	53	19	1,001,000
Clair Engle Lake (Lewiston) (P)	69	74	76	67	2,438,000
Lake Almanor (P)	68	73	52	71	1,036,000
Lake Berryessa (FIMW)	77	83	83	72	1,600,000
Millerton Lake (FI)	52	35	65	42	503,200
Shasta Lake (FIPR)	76	69	71	67	4,377,000
CALIFORNIA—NEVADA					
Lake Tahoe (IPR)	32	66	51	31	744,600
NEVADA					
Rye Patch (I)	31	71	59	30	194,300
ARIZONA—NEVADA					
Lake Mead and Lake Mohave (FIMP)	94	94	70	93	27,970,000
ARIZONA					
San Carlos (IP)	58	79	26	55	935,100
Salt and Verde River system (IMPR)	84	84	45	80	2,019,100
NEW MEXICO					
Conchas (FIR)	88	98	79	91	330,100
Elephant Butte and Caballo (FIPR)	95	94	36	92	2,442,000

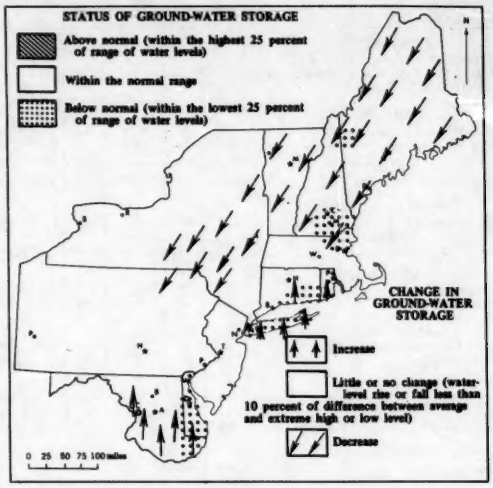
[a] 1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second day.
[b] Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

GROUND-WATER CONDITIONS DURING JANUARY 1988

Ground-water levels declined in northern New England, east-central New York State, and adjacent northeastern Pennsylvania. (See map.) [**Editor's Note:** *On last month's map, all of the vertical arrows with the arrowheads pointing down should have been pointing up.*] Levels rose in southern Connecticut and Rhode Island, on Long Island, New York, and also in eastern Maryland. Levels near the end of January were below average in scattered parts of New England and remained below average on Long Island, New York. The level at the Camden observation well, near Dover, Delaware, was again the lowest for the current month in at least 20 years. Elsewhere in the Northeast, ground-water levels were near average for this time of year.

In the Southeastern States, ground-water levels rose in Kentucky, Virginia, Arkansas, and Mississippi. Net changes in levels were mixed in West Virginia, North Carolina, and Georgia. Water levels were above long-term averages in Kentucky and North Carolina, and below average in Arkansas. Levels were mixed with respect to average in West Virginia and Virginia. New low levels for January were reached in the key well in Memphis, in western Tennessee, and in the Cockspur Island well in the Savannah area of Georgia. Despite net rises in level during the month, new January lows also occurred in the Stuttgart well in Arkansas and the Montgomery key well in Alabama.

In the central and western Great Lakes States, ground-water levels rose in Indiana, showed mixed

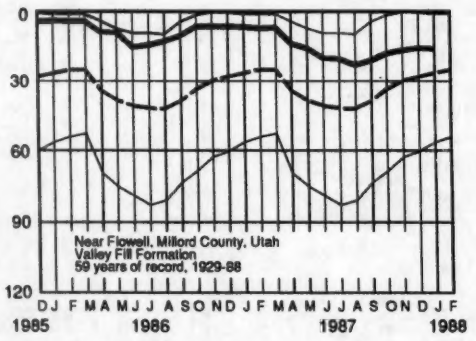

STATUS OF GROUND-WATER STORAGE
Above normal (within the highest 25 percent of range of water levels)
Within the normal range
Below normal (within the lowest 25 percent of range of water levels)
N
CHANGE IN GROUND-WATER STORAGE
Increase
Little or no change (water-level rise or fall less than 10 percent of difference between average and extreme high or low level)
Decrease
0 25 50 75 100 miles

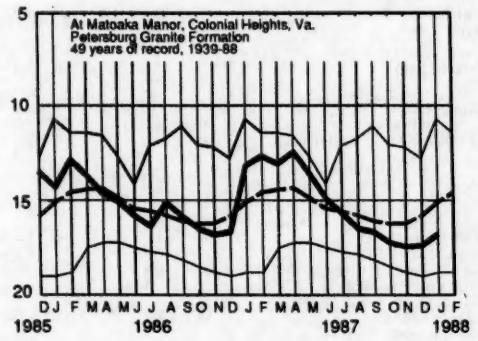
Map showing ground-water storage near end of January and change in ground-water storage from end of December to end of January.

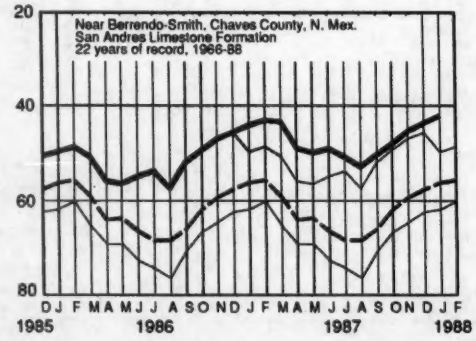
MONTHEND GROUND-WATER LEVELS IN KEY WELLS

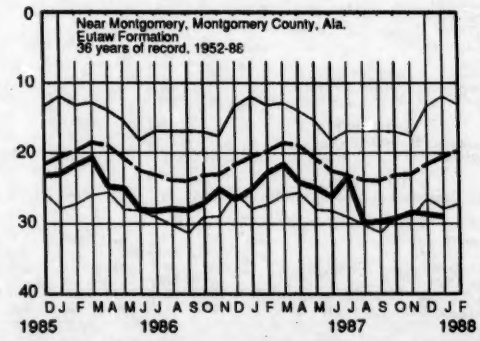
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates average of monthly levels in previous years. Heavy line indicates level for current period.

WATER LEVEL, FEET BELOW LAND-SURFACE DATUM


0
30
60
90
120
Near Flowell, Millord County, Utah
Valley Fill Formation
59 years of record, 1929-88
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988


5
10
15
20
At Matoaka Manor, Colonial Heights, Va.
Petersburg Granite Formation
49 years of record, 1939-88
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988


20
40
60
80
Near Berrendo-Smith, Chaves County, N. Mex.
San Andres Limestone Formation
22 years of record, 1966-88
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988


0
10
20
30
40
Near Montgomery, Montgomery County, Ala.
Eutaw Formation
36 years of record, 1952-86
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F
1985
1986
1987
1988

changes in Michigan and Iowa, and declined in most wells in Minnesota. Water levels were mostly above average in Iowa and below average in Minnesota. Levels were mixed with respect to average in Michigan and were within the normal range in Ohio.

In the Western States, ground-water levels rose in Nevada and Arizona, and also rose in most of the key wells in Nebraska and New Mexico. Levels declined in North Dakota and in most of the key wells in Idaho. Mixed water-level changes occurred in Washington, southern California, Utah, Kansas, and Texas. Water levels were above long-term averages in North Dakota and Nebraska, and were below average in Arizona and in most of the key wells in Idaho. Levels were mixed with respect to average in Washington, southern California, Nevada, Utah, Kansas, New Mexico, and Texas. A new January high ground-water level occurred in the Steptoe Valley well in Nevada, and a new all-time high level (22 years of record) was reached in the Berrendo-Smith observation well in New Mexico. New January lows occurred in wells in the Logan area in Utah, in the El Paso area in western Texas, and, despite a slight net rise during the month, in the Kansas Agricultural Experiment Station key well in Colby, Kansas.

Provisional data; subject to revision

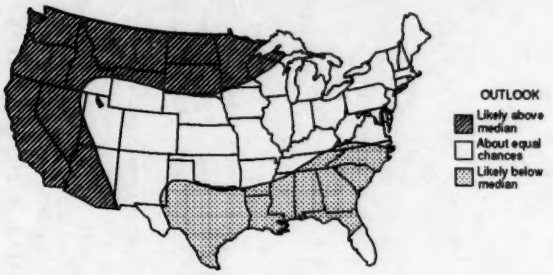
WATER LEVELS IN KEY OBSERVATION WELLS IN SOME REPRESENTATIVE AQUIFERS IN THE CONTERMINOUS UNITED STATES--JANUARY 1988

Aquifer and Location	Water level in feet with reference to land-surface datum	Departure from average in feet	Net change in water level in feet since: Last month	Last year	Year records began	Remarks
Glacial drift at Hanska, south-central Minnesota	−13.12	−4.36	−0.80	−6.98	1942	
Glacial drift at Roscommon in north-central part of Lower Peninsula, Michigan.	−5.01	−0.12	−0.11	−0.54	1935	
Glacial drift at Marion, Iowa	−2.83	+3.43	−0.18	+1.13	1941	
Glacial drift at Princeton in northwestern Illinois	−4.7	+8.4	+1.2	+3.3	1943	
Petersburg Granite, southeastern Piedmont near Fall Zone, Colonial Heights, Virginia.	−16.80	−1.68	+0.59	−3.60	1939	
Glacial outwash sand and gravel, Louisville, Kentucky (U.S. well no. 2).	−19.29	+5.91	0	−0.73	1946	
500-foot sand aquifer near Memphis, Tennessee (U.S. well no. 2).	−106.52	−16.80	−0.03	+1.26	1941	Jan. low.
Weathered granite, Mocksville area, Davie County, western Piedmont, North Carolina.	−17.6	+2.5	+0.9	+0.7	1932	
Sparta Sand in Pine Bluff industrial area, Arkansas	−231.50	−31.73	+3.30	−0.40	1958	
Eutaw Formation in the City of Montgomery, Alabama (U.S. well no. 4).	−28.7	−8.2	+0.3	−3.6	1952	Jan. low.
Limestone aquifer on Cockspur Island, Savannah area, Georgia (U.S. well no. 6).	−34.32	−7.79	−0.88	−0.11	1956	Jan. low.
Sand and gravel in Puget Trough, Tacoma, Washington.	−103.19	+5.73	+0.84	−2.18	1952	
Pleistocene glacial outwash gravel, North Pole, northern Idaho (U.S. well no. 3).	−466.8	−5.8	−0.9	−2.0	1929	
Snake River Group: Snake River Plain Aquifer, at Eden, Idaho (U.S. well no. 4).	−122.1	−3.0	−1.5	−1.5	1957	
Alluvial valley fill in Flowell area, Millard County, Utah (U.S. well no. 9).	−16.10	+8.98	−0.34	−9.41	1929	
Alluvial sand and gravel, Platte River Valley, Ashland, Nebraska (U.S. well no. 6).	−4.85	+0.99	−0.60	−1.15	1935	
Alluvial valley fill in Steptoe Valley, Nevada	−6.80	+5.72	+0.29	+0.37	1950	Jan. high.
Pleistocene terrace deposits in Kansas River valley, at Lawrence, northeastern Kansas.	−20.21	+0.81	−0.11	−3.07	1953	
Alluvium and Paso Robles clay, sand, and gravel, Santa Maria, California.	−126.58	+14.80	+1.60	−10.52	1957	
Valley fill, Elfrida area, Douglas, Arizona (U.S. well no. 15).	−102.3	−21.9	+0.2	+0.6	1951	
Hueco bolson, El Paso area, Texas	−266.89	−19.54	0	−1.29	1965	Jan. low.
Evangeline aquifer, Houston area, Texas	−300.76	−2.26	+1.46	+14.75	1965	

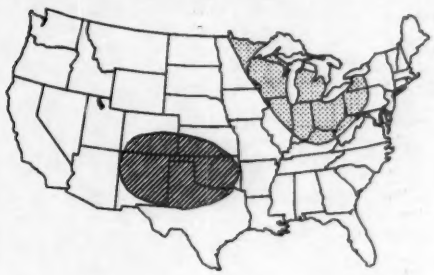
NATIONAL WATER CONDITIONS STREAMFLOW INDEX STATIONS IN THE CONTERMINOUS UNITED STATES

101 02371500 Conecuh River at Brantley, Ala.
102 02424000 Cahaba River at Centreville, Ala.
103 03574500 Paint Rock River near Woodville, Ala.
106 02467000 Tombigbee River at Demopolis L&D near Coatopa, Ala.
401 09415000 Virgin River at Littlefield, Ariz.
402 09448500 Gila River at Head of Safford Valley near Solomon, Ariz.
403 09471000 San Pedro River at Charleston, Ariz.
404 09498500 Salt River near Roosevelt, Ariz.
405 09508500 Verde River below Tangle Creek, above Horseshoe Dam, Ariz.
406 09402000 Little Colorado River near Cameron, Ariz.
501 07056000 Buffalo River near St. Joe, Ark.
502 07363500 Saline River near Rye, Ark.
601 10296000 West Walker River below Little Walker River, near Coleville, Calif.
602 11096000 Arroyo Seco near Pasadena, Calif.
604 11427000 North Fork American River at North Fork Dam, Calif.
605 11532500 Smith River near Crescent City, Calif.
606 11425500 Sacramento River at Verona, Calif.
609 11264500 Merced River at Happy Isles Bridge, near Yosemite, Calif.
801 06710500 Bear Creek at Morrison, Colo.
802 07096000 Arkansas River at Canon City, Colo.
803 09085000 Roaring Fork River at Glenwood Springs, Colo.
804 09239500 Yampa River at Steamboat Springs, Colo.
805 09361500 Animas River at Durango, Colo.
901 01121000 Mount Hope River near Warrenville, Conn.
902 01188000 Burlington Brook near Burlington, Conn.
903 01193500 Salmon River near East Hampton, Conn.
904 01204000 Pomperaug River at Southbury, Conn.
1106 01646502 Potomac River (Adjusted) near Washington, D.C.
1201 02232500 St. Johns River near Christmas, Fla.
1202 02256500 Fisheating Creek at Palmdale, Fla.
1203 02296750 Peace River at Arcadia, Fla.
1204 02369000 Shoal River near Crestview, Fla.
1206 02320500 Suwannee River at Branford, Fla.
1207 02358000 Apalachicola River at Chattahoochee, Fla.
1301 02317500 Alapaha River at Statenville, Ga.
1302 02347500 Flint River near Culloden, Ga.
1303 02392000 Etowah River at Canton, Ga.
1306 02226000 Altamaha River at Doctortown, Ga.
1601 13037500 Snake River near Heise, Idaho
1606 13269000 Snake River at Weiser, Idaho
1607 13317000 Salmon River at White Bird, Idaho
1608 13342500 Clearwater River at Spalding, Idaho
1701 03380500 Skillet Fork at Wayne City, Ill.
1702 05435500 Pecatonica River at Freeport, Ill.
1703 05572000 Sangamon River at Monticello, Ill.
1706 03377500 Wabash River at Mount Carmel, Ill.
1707 05446500 Rock River near Joslin, Ill.
1801 03326500 Mississinewa River at Marion, Ind.
1802 03373500 East Fork White River at Shoals, Ind.
1901 05464500 Cedar River at Cedar Rapids, Iowa
1902 06485500 Big Sioux River at Akron, Iowa
1903 06810000 Nishnabotna River above Hamburg, Iowa
1906 05474500 Mississippi River at Keokuk, Iowa
1907 05480500 Des Moines River at Fort Dodge, Iowa
2001 06867000 Saline River near Russell, Kans.
2002 06884400 Little Blue River near Barnes, Kans.
2006 07146500 Arkansas River at Arkansas City, Kans.
2101 03263500 Licking River at Catawba, Ky.
2102 03308500 Green River at Munfordville, Ky.
2106 03294500 Ohio River at Louisville, Ky.
2201 07352000 Saline Bayou near Lucky, La.
2202 07378500 Amite River near Denham Springs, La.
2203 08013500 Calcasieu River near Oberlin, La.
2206 02489500 Pearl River near Bogalusa, La.
2301 01031500 Piscataquis River near Dover-Foxcroft, Maine
2302 01057000 Little Androscoggin River near South Paris, Maine
2306 01014000 St. John River below Fish River at Fort Kent, Maine
2401 01491000 Choptank River near Greensboro, Md.
2402 01645000 Seneca Creek at Dawsonville, Md.
2501 01173000 Ware River at Intake Works near Barre, Mass.
2601 04040500 Sturgeon River near Sidnaw, Mich.
2602 04112500 Red Cedar River at East Lansing, Mich.
2603 04121500 Muskegon River at Evart, Mich.
2701 05062000 Buffalo River near Dilworth, Minn.
2702 05280000 Crow River at Rockford, Minn.
2706 05133500 Rainy River at Manitou Rapids, Minn.
2707 05288500 Mississippi River near Anoka, Minn.
2708 05330000 Minnesota River near Jordan, Minn.
2709 05331000 Mississippi River at St. Paul, Minn.
2801 02479000 Pascagoula River at Merrill, Miss.
2802 07290000 Big Black River near Bovina, Miss.
2806 07289000 Mississippi River at Vicksburg, Miss.
2901 06897500 Grand River near Gallatin, Mo.
2902 06933500 Gasconade River at Jerome, Mo.
2906 06934500 Missouri River at Hermann, Mo.
3001 06099500 Marias River near Shelby, Mont.
3002 06191500 Yellowstone River at Corwin Springs, Mont.
3003 12354500 Clark Fork at St. Regis, Mont.
3004 12358500 Middle Fork Flathead River near West Glacier, Mont.
3006 06214500 Yellowstone River at Billings, Mont.
3101 06454500 Niobrara River above Box Butte Reservoir, Nebr.
3102 06800500 Elkhorn River at Waterloo, Nebr.
3201 10322500 Humboldt River at Palisade, Nev.
3301 01076500 Pemigewasset River at Plymouth, N.H.
3401 01396500 South Branch Raritan River near High Bridge, N.J.
3402 01411000 Great Egg Harbor River at Folsom, N.J.
3406 01463500 Delaware River at Trenton, N.J.
3501 08378500 Pecos River near Pecos, N. Mex.
3502 08408500 Delaware River near Red Bluff, N. Mex.
3503 09430500 Gila River near Gila, N. Mex.
3506 08276500 Rio Grande below Taos Junction Bridge near Taos, N. Mex.
3601 01309500 Massapequa Creek at Massapequa, N.Y.
3602 01503000 Susquehanna River at Conklin, N.Y.
3603 04262500 West Branch Oswegatchie River near Harrisville, N.Y.
3606 01318500 Hudson River at Hadley, N.Y.
3607 01357500 Mohawk River at Cohoes, N.Y.
3608 04264331 St. Lawrence River at Cornwall, Ontario, near Massena, N.Y.
3701 02102000 Deep River at Moncure, N.C.
3702 02091500 Contentnea Creek at Hookerton, N.C.
3703 02118000 South Yadkin River near Mocksville, N.C.
3704 03451500 French Broad River at Asheville, N.C.
3706 02105500 Cape Fear River at William O. Huske Lock near Tarheel, N.C.
3801 06354000 Cannonball River at Breien, N. Dak.
3806 05082500 Red River of the North at Grand Forks, N. Dak.
3901 03109500 Little Beaver Creek near East Liverpool, Ohio
3902 04193500 Maumee River at Waterville, Ohio
3906 03234500 Scioto River at Higby, Ohio
4006 07331000 Washita River near Dickson, Okla.
4101 14046500 John Day River at Service Creek, Oreg.
4102 14301500 Wilson River near Tillamook, Oreg.
4103 14321000 Umpqua River near Elkton, Oreg.
4106 14105700 Columbia River at The Dalles, Oreg.
4107 14191000 Willamette River at Salem, Oreg. (Adjusted)
4201 03020500 Oil Creek at Rouseville, Pa.
4202 03079000 Casselman River at Markleton, Pa.
4203 03106000 Connoquenessing Creek near Zelienople, Pa.
4206 01570500 Susquehanna River at Harrisburg, Pa.
4207 03049500 Allegheny River at Natrona, Pa.
4208 03085000 Monongahela River at Braddock, Pa.
4402 01117500 Pawcatuck River at Wood River Junction, R.I.
4501 02132000 Lynches River at Effingham, S.C.
4502 02173500 North Fork Edisto River at Orangeburg, S.C.
4506 02131000 Pee Dee River at Peedee, S.C.
4601 06441500 Bad River near Fort Pierre, S. Dak.
4701 03434500 Harpeth River near Kingston Springs, Tenn.
4702 03540500 Emory River at Oakdale, Tenn.
4703 03604500 Buffalo River near Lobelville, Tenn.
4706 03469000 French Broad River below Douglas Dam, Tenn.
4801 08033500 Neches River near Rockland, Tex.
4802 08095000 North Bosque River near Clifton, Tex.
4803 08134000 North Concho River near Carlsbad, Tex.
4804 08167500 Guadalupe River near Spring Branch, Tex.
4901 09180500 Colorado River near Cisco, Utah
4902 09299500 Whiterocks River near Whiterocks, Utah
4903 10128500 Weber River near Oakley, Utah
4905 10234500 Beaver River near Beaver, Utah
4906 09315000 Green River at Green River, Utah
5001 04287000 San Juan River near Bluff, Utah
5101 01667500 Dog River at Northfield Falls, Vt.
5102 02030500 Rapidan River near Culpeper, Va.
5103 02045500 Slate River near Arvonia, Va.
5104 03488000 Nottoway River near Stony Creek, Va.
4907 09379500 North Fork Holston River near Saltville, Va.
5301 12027500 Chehalis River near Grand Mound, Wash.
5302 12134500 Skykomish River near Gold Bar, Wash.
5303 12422500 Spokane River at Spokane, Wash.
5401 01610000 Potomac River at Paw Paw, W.Va.
5402 03183500 Greenbrier River at Alderson, W. Va.
5406 03193000 Kanawha River at Kanawha Falls, W. Va.
5501 04071000 Oconto River near Gillett, Wis.
5502 05362000 Jump River at Sheldon, Wis.
5506 04084500 Fox River at Rapide Croche Dam near Wrightstown, Wis.
5507 05365500 Chippewa River at Chippewa Falls, Wis.
5508 05407000 Wisconsin River at Muscoda, Wis.
5601 06298000 Tongue River near Dayton, Wyo.
5602 06630000 North Platte River above Seminoe Reservoir near Sinclair, Wyo.

TEMPERATURE OUTLOOK FOR FEBRUARY THROUGH APRIL 1988



PRECIPITATION OUTLOOK FOR FEBRUARY THROUGH APRIL 1988



NATIONAL WATER CONDITIONS

JANUARY 1988

Based on reports from the Canadian and U.S. Field offices; completed February 22, 1988

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EXPLANATION OF DATA (Revised January 1988)

Cover map shows generalized pattern of streamflow for the month based on provisional data from 183 index gaging stations--18 in Canada, 163 in the United States, and 2 in the Commonwealth of Puerto Rico. Alaska, Hawaii, and Puerto Rico inset maps show streamflow only at the index gaging stations that are located near the point shown by the arrows. Classifications on map are based on comparison of streamflow for the current month at each index station with the flow for the same month in the 30-year reference period, 1951-80. Shorter reference periods are used for one Canadian index station, two Kansas index stations, one New York index station, and the Puerto Rico index stations because of the limited records available.

The *persistence/change map* shows where streamflow has persisted in the above- or below-normal range from last month to this month and also where streamflow is in the above- or below-normal range this month after being in a different range last month. The pie charts show percent of stations reporting discharges in each flow range for the conterminous United States, southern Canada, the two areas combined, and also the percent of area in each flow range for the conterminous United States and southern Canada. The bar graph shows total mean and total median flow for all reporting stations in the conterminous United States and southern Canada.

The comparative data are obtained by ranking the 30 flows for each month of the reference period in order of decreasing magnitude--the highest flow is given a ranking of 1 and the lowest flow is given a ranking of 30. Quartiles (25-percent points) are computed by averaging the 7th and 8th highest flows (upper quartile), 15th and 16th highest flows (middle quartile and median), and the 23rd and 24th highest flows (lower quartile). The upper and lower quartiles set off the highest 25 percent of flows and lowest 25 percent of flows, respectively, for the reference period. The median (middle quartile) is the middle value by definition. For the reference period, 50 percent of the flows are greater than the median, 50 percent are less than the median, 50 percent are between the upper and lower quartiles (in the normal range), 25 percent are greater than the upper quartile (above normal), and 25 percent are less than the lower quartile (below normal). Flow for the current month is then classified as: *above normal* if it is greater than the upper quartile, *in the normal range* if it is between the upper and lower quartiles, and *below normal* if it is less than the lower quartile. Change in flow from the previous month to the current month is classified as *seasonal* if the change is in the same direction as the change in the median. If the change is in the opposite direction of the change in the median, the change is classified as *contraseasonal* (opposite to the seasonal change). For example: at a particular index station, the January median is greater than the December median; if flow for the current January increased from December (the previous month), the increase is seasonal; if flow for the current January decreased from December, the decrease is contraseasonal.

Flood frequency analyses define the relation of flood peak magnitude to probability of occurrence or recurrence interval. *Probability of occurrence* is the chance that a given flood magnitude will be exceeded in any one year. *Recurrence interval* is the reciprocal of probability of occurrence and is the *average* number of years between occurrences. For example, a flood having a probability of occurrence of 0.01 (1 percent) has a recurrence interval of 100 years. *Recurrence intervals imply no regularity of occurrence*; a 100-year flood might be exceeded in consecutive years or it might not be exceeded in a 100-year period.

Statements about *ground-water levels* refer to conditions near the end of the month. The water level in each key observation well is compared with average level for the end of the month determined from the 30-year reference period, 1951-80, or from the entire past record for that well when only limited records are available. Comparative data for ground-water levels are obtained in the same manner as comparative data for streamflow. *Changes in ground-water levels*, unless described otherwise, are from the end of the previous month to the end of the current month.

Dissolved solids and temperature data for January are given for five stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). *Dissolved solids* are minerals dissolved in water and usually consist predominately of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. *Dissolved-solids discharge* represents the total daily amount of dissolved minerals carried by the stream. *Dissolved-solids concentrations* are generally higher during periods of low streamflow, but the highest dissolved-solids *discharges* occur during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at times of low flow.

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